

# Mekong-Salween Divide: The Floristic Boundary in Sino-Himalaya

The Ward Line – Mekong-Salween Divide (MSD) is a classic geographical barrier brought forward by Francis Kingdon-Ward in 1921. In recent years, studies have suggested that the MSD was the main driver behind the contemporary diversity and population differentiation of vertebrates and plants, such as *Sinopodophyllum hexandrum* and *Taxus wallichiana* located in forests or alpine meadows.

To reveal the MSD's role in shaping the population structure of plant species that restricted in the subnival belt of the Himalayas Hengduan Mountains (HHM) region, scientist SUN Hang and his team from the Kunming Institute of Botany, Chinese Academy of Sciences reconstructed the phylogeography of *Marmoritis complanatum* combined with climatic data analysis and species distribution modelling (SDM) endemic to the subnival belt of the HHM region.

The phylogeographic differentiation of *M. complanatum* was identified between two geographic regions – Central-Eastern Himalaya (CEH) vs. Hengduan Mountains (HM) – across the MSD, and the differentiation of two lineages began in the early Pliocene (4.49 Ma), coinciding with the formation of the MSD. Climatic data analysis suggested a moister environment for *M. complanatum* the HM region than that in the CEH region. These results indicated the MSD was the main driver of the phylogeographic differentiation for *M. complanatum*.

High genetic diversity and inter-population differentiation were detected in *M. complanatum* based on the cpDNA and nrDNA data, exhibiting an island-like population structure, which has also been detected in other subnival species, such as the perennial herbs *Eriophyton wallichii*, *Thalictrum squamiferum* and



*Marmoritis complanatum* from different populations.

*Chionocharis hookeri* in the HHM region.

Mismatch distribution analyses and species distribution modelling indicated that the species' broad-scale distributions remained relatively stable with signs of a little shrinkage of populations after the Last Glacial Maximum, suggesting Quaternary glaciations had little impact on the large-scale distributional range shift of *M. complanatum*.

This study offered the first evidence for the effects of the MSD on the phylogeographic structure of the subnival plant species, and identified the importance of the floristic boundary represented by the MSD.

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